of vascular pressure, when the pressure was that of blood almost at rest, one suddenly replaced the respiration of chloroformized air by normal air without being able to save the animal.

"After a few forced inspirations one sometimes sees the automatic breathing of the animal recommence. This may be up to two, four, and, as in one case, ten automatic inspirations; but the pressure of the blood does not rise, and the dog dies through cessation of circulation.

"Fortunately things do not always go thus. It is possible to find that a very limited quantity of chloroform mixed with the air may maintain a state of apparent death without any automatic respiration, and with an extreme fall of arterial pressure that yet admits, after half an hour's continuance of chloroformization, of the re-establishment of life on pure air being introduced. But the keeping the animal alive in such an experiment is always uncertain: we cannot make sure, as with ether, that the animal will be revived. We are never able to say, and this is a great point, what the limit of chloroform is in the inspired air, which affords us a certainty of the animal being restored."

Prof. Schiff considers that chloroform should be banished from practice as an anæsthetic agent, except in cases in which extraordinary resistance to the effect of ether shows itself, in which instances it might be allowed to mix a little chloroform with it in order to produce the commencement of anæsthesia, which should afterwards be continued with pure ether.

Prof. S. warns surgeons not to continue on operation immediately on a patient's recovery from the excessive action of anæsthetics, but to wait until respiration has been energetically restored, otherwise a new and generally fatal asphyxia may be produced.

14. *Physiological Action of Coca.*—Dr. ALEX. BENNETT states (*Brit. Med. Journ.*, April 18, 1874) that with the aid of Messrs. Macfarlane & Co., chemists, he succeeded in obtaining a small quantity of the crystalline substance cocaine ($C_{16}H_{19}NO_4$). With this he conducted a series of experiments and observations on the lower animals, from which he ascertained that cocaine is a powerful poison with special action on the nervous system. He has also experimented with theine, caffeine, guaranine, and theobromine, with a view of determining the actions of each.

The following are his conclusions:—

1. The physiological actions of coca, tea, coffee, guarana, and cocoa, are mainly, if not entirely, due to their neutral principles.
2. Cocaine, theine, caffeine, guaranine, and theobromine are powerful poisons, inducing a series of symptoms affecting the nervous, respiratory, circulatory, vaso-motor, and glandular systems, which terminate, if the dose be large enough, in death.
3. These five principles are, to all appearances, identical in physiological action.
4. In small doses not ending fatally, these five substances produce—*a.* Cerebral excitement not succeeded by coma, and *b.* Partial loss of sensibility.
5. In large doses they produce—*a.* Cerebral excitement, *b.* Complete paralysis of sensibility, *c.* Tetanic spasms and convulsions, and *d.* Death.
6. They paralyze the entire posterior column of the spinal cord, also the entire system of peripheral sensory nerves; but the anterior columns of the cord and the peripheral motor nerves are not paralyzed.
7. They frequently produce convulsions of a clonic character, but occasionally they cause tetanic spasms, which latter are sometimes so severe as to induce opisthotonos.
8. They do not produce muscular paralysis.
9. They at first increase, then impede, and lastly stop, the respirations.
10. They at first increase, and finally diminish, both the force and frequency of the heart's contractions.
11. They produce at first contraction, and afterwards dilatation, of the capillaries and small bloodvessels, with stasis of the blood, indicating first irritation, and subsequent paralysis, of the vaso-motor nerves.

12. They affect the temperature by first slightly lowering, and secondly increasing it.
13. They usually produce contraction of the pupil.
14. They produce an increase of the salivary secretion.
15. They induce a peculiar form of tenesmus, accompanied by a copious discharge of clear mucus from the bowels.

These conclusions have been arrived at after a careful series of experiments conducted on more than one hundred animals of different kinds; and it is extremely interesting to learn that those agents, which the different nations of the world have found by experience to produce refreshing and stimulating beverages, although unlike one another and procured from totally different sources, possess in common proximate principles, which not only are almost identical in chemical composition, but also appear similar in physiological action.

According to the above observations, cocaine has the same action as theine, etc.; so, for clinical purposes, the latter is at present preferable on account of the enormous expense of the former. That the effects of the beverages themselves are mainly, if not entirely, due to the neutral principles they contain, is highly probable; but of their beneficial action in medical practice I am not yet in a position to give an opinion. However, from their stimulant action and effect on the nervous system generally, there is every reason to hope that the concentrated forms of these drugs, or the neutral principles themselves, will prove powerful and useful agents in the hands of the physician for the treatment of disease.

Before the medical man can practise his profession scientifically, he should be acquainted, not only with the natural course of the malady he proposes to alleviate, but also with the physiological effects of the drug by which he hopes to reach this end. By observations upon the lower animals, he may also obtain suggestions and information which will materially assist him in relieving and benefiting the human being.

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15. *Importance of the Purity of Chloral Hydrate.*—Dr. OSCAR LIEBREICH has recently published a paper in the *Berliner Klinische Wochenschrift*, in which he calls attention to the important subject of the purity of chloral hydrate, and the effect which its deterioration may produce on the patients to whom it is administered, and on its reputation as a remedy. The case, he says, is different from that of such a substance as quinia, the adulteration of which will only reduce, but will not pervert, the proper action of the drug. With chloral and other substances prepared by analogous chemical processes, the result of the manufacture may be the formation of compounds which, if administered, produce an altogether different result from that intended. The process of manufacture is one which requires great care; and it seems that it is at least difficult to insure the purity of chloral, if made in large quantities. Liebig himself, who discovered it, never attempted to make more than a few grammes at once; and Dr. Liebreich was so convinced, when he brought it into notice as a medicinal agent, that purity was necessary for success, that the first supplies were made under his immediate superintendence. At present, it is manufactured in various places; and the result is that, in some parts of the continent, notably in Saxony and Switzerland, it has fallen into disrepute. Dr. Liebreich has made a collection of specimens of the drug used in cases where it has failed to produce its proper action, and possesses, he says, some horrible chemical compounds which he would not venture to give to a human being. He prefers the crystallized form of chloral hydrate as the most stable. It may contain hydrochloric acid; this is no disadvantage if the proportion remain the same; but, if it increase, it indicates that the formation of dangerous compounds may be going on. Sometimes the hypnotic action is increased; this he attributes to the production of chlorine compounds, which are more readily changed into chloroform than chloral itself is. An acid reaction, arising from the formation of trichloracetic acid, does not show that the chloral is unfit for use, though it weakens its action. In pure chloral, this action is limited; while impure chloral is liable to the constantly increasing production of acid compounds—not trichloracetic acid—of a deleterious nature. Dr. Liebreich remarks that